|| SALGROM TECHNOLOGIES OY - Salgrom SPIDER™ /Salgrom Sense™

the challenge

Safety at sea and especially container fire safety has received significant attention in past years due the heavily increasing amount of dangerous goods transportation. The battery electric vehicles (BEV) market share has skyrocketed and at the same time other battery-operated devices have become ever more popular. Safety reports show that battery related fires have increased five times since 2016. Most battery-operated goods are transported in sea containers around the world, their origin being usually in Asia. Very cheap and poor-quality toys are one example of high fire risk products. Other issue are damaged vehicles which are transported for demolition purposes.

Li-Ion batteries are not the only high fire risk segment. Charcoal and other self-igniting materials, which are also transported from the Asia to Europe & US are very high-risk cargo since they are a self-heating substances.

Fire in a container vessel is always a serious problem and extremely risky for the crew. Unfortunately, we have seen many dramatic cases in past years where the whole ship has sunk, and crew members lost their lives. Crew members have very limited time to react and very limited efficient fire-fighting equipment against the fire inside the container. Water can be used for cooling the container from outside, but that is not very efficient. There are some new innovations, like Spider that may help, though.

the innovation

The innovation that solves the container fires is called Salgrom *Spider*. This device is developed to act as container internal fire suppression system and to react very early to the raising temperature with aerosol fire suppression (physical & chemical). The very early reaction gives much better probability of extinguishing the fire and also preventing fire from spreading to other containers. Spider mount and dismount takes just a few seconds via strong magnets on the bottom of the product. This makes Spider very easy to move from one container to another and the lifecycle can be more than 10 years. *Spider* is a fully mechanical device, it does not include any electric components, nor wiring, so it is fully maintenance

free. Its metal frame makes it very robust, and it is designed to be resistant for hard handling at the ports. Salgrom *Spider* and Salgrom *Sense* IoT device are a unique combination for container safety. Salgrom *Sense* passes the temperature information from the container as early warning to the vessel bridge, giving extra time for early reaction.

how it was implemented

Development of the *Spider* began in 2019 and the patent was granted in 2021. *Spider* fire suppression efficiency has been established in various fire tests, including accredited fire test laboratories. All the tests have been successful, and the product has been noted to be a perfect and very efficient solution for the container fires. Now *Spider* is widely used e.g., on WEEE (Waste from Electrical and Electronic Equipment) containers and it has also been successfully tested for WEEE fires.

The aerosol compound itself is a solid and unpressurized material, originally developed for space industry and today widely used in NATO and NASA destinations. It has wide range of different certifications, for example UL & ULC certificates.

One of the key features of the aerosol is that it is environment friendly. When properly designed, it does not pose a greater environmental or human health risk than other commonly available substitutes in the same end use. Aerosols do not contain CFCs, HFCs or PFCs, chlorine, bromide, or sulphur fluoride, nor do they form toxic halogen acids or hydrogen fluorides when in contact with hot surfaces or fire. Aerosol does not cause emissions to the water either.

result

Based on the feedback from maritime key players, the solution is unique and definitely gives a significant safety improvement for the container fire safety. *Spider* is very easy to install &

use, quick to move from one container to another. Since the *Spider* is installed inside a container, it reacts very fast to the fire and it guards 24/7 without the need of crew member action. Similarly, in case of fire, it works automatically without jeopardizing crew safety.

conclusion

Most probably the Spider will be the one critical part within container firefighting. Spider is the first available tool for container internal fire suppression and it is believed that the

- effectiveness
- easiness to use
- mobility from one container to another
- long lifetime
- reliability

will make *Spider* a most preferrable solution in the near future.

See the Spider in action on Salgrom YouTube channel:
https://www.youtube.com/watch?v=6zJMeb9R4SQ&ab_channel=SalgromTechnologies